

REMARKS

Claims 1-20 were examined. No claims are amended. Claims 1-6, 8, 14-15 and 18-22 remain in the Application.

The Patent Office rejects claims 1-3, 5, 6, 8, 14-15, 18 and 20-21 under 35 U.S.C. §103(a). The Patent Office objects to claim 4-6, 8, 19 and 22 as being dependent upon a rejected base claim but finds such claims otherwise allowable over the prior art of record. Applicant respectfully requests consideration of the pending claims in view of the above amendments and the following remarks.

A. 35 U.S.C. §103(a): Rejection of Claims 1 & 14

The Patent Office rejects claims 1 & 14 under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,661,080 of Glenn, et al. (Glenn) in view of U.S. Patent No. 6,794,273 of Saito (Saito).

Independent claim 1 is not obvious over the cited references, because the cited references do not disclose a method including selecting a dicing tape with an adhesive layer that has a thickness greater than a height of one or more bump electrodes formed on the first side of the wafer; and applying the dicing tape to the first side of the wafer such that the adhesive layer contacting conforms to the one or more bump electrodes.

Glenn describes placing a single layer tape on a first surface of chips of a wafer, the single layer tape having punched holes positioned over active areas of the chips. “Consequently, the single layer tape on the first surface of the wafer includes tape holes positioned over the active areas of the chips that are separated, and surrounded, by tape portions detached to the non-active area of the first surface of the chips.” Col. 2, lines 5-19. Glenn then applies a vacuum device having suction ports that fit on the tape over the active areas. “In this manner, according to the invention, the active area of the chips on the wafer are not contacted by, contaminated by, or damaged by the custom vacuum chuck. However, since the flats of the custom vacuum chuck are formed so that the bulk of the flats are positioned over the entire active areas of the chips, the active areas on the first surface of the chips are protected from

silicon shards, particulates, water and any other damage or contamination during the singulation process.” Col. 2, lines 30-39.

Saito describes a handling method wherein a frame is placed on a interposer that surrounds semiconductor chips and a resin may be filled between the frame. With reference to Fig. 16A and 17 of Saito, the reference describes frame 36 arranged and fixed on interposer 30 such that frame 36 surrounds semiconductor chips 31. Resin 37 may be filled between frame 36 and semiconductor chips 31.

The combined teachings of Glenn and Saito do not teach applying a dicing tape such that an adhesive layer contacts and conforms to one or more bump electrodes on a first side of a wafer. Neither reference teaches applying an adhesive layer of a tape that contacts bump electrodes. The Patent Office points to reference number 301 of Glenn to represent the bump electrode. However, reference number 301 identifies scribe lines, i.e., the non-active area of a chips. Glenn does not describe its scribe lines as "electrodes." An electrode, as used in the context of the Application, is an electrically conductive structure. Glenn describes a scribe line that is not described as electrically conductive. If the Patent Office believes a scribe line is equivalent to an electrode, Applicant requests that the Patent Office cite a reference for this point. (See MPEP 2144.03)

Combining Glenn and Saito does not arrive at the teachings of claim 1. Even assuming scribe line 301 of Glenn is an electrode, an assumption to which Applicant strongly disagrees, the combined teachings do not teach applying a dicing tape that contacts and conforms to one or more bump electrodes. Saito teaches a resin layer not a tape that may be filled on a chip between a frame.

Independent claim 14 is not obvious over cited references, because the cited references do not describe determining the heights of one or more bump electrodes on a first side of a wafer surface, selecting a dicing tape; and applying a first side of the dicing tape to the first side of the wafer such that an adhesive layer of the dicing tape contacts and conforms to the one or more bumper electrodes. Neither Glenn or Saito provides or describes contacting or conforming a tape to one or more bump electrodes and no motivation can therefore be taken for such an application.

B. 35 U.S.C. §103(a): Rejection of Claims 2 & 15

The Patent Office rejects claims 2 and 15 under 35 U.S.C. §103(a) as obvious over Glenn and Saito as applied to claims 1 and 14, respectively, and further in view of U.S. Patent Application 2002/0161100 of Kojima et al. (Kojima). Kojima is cited for teaching a double-bumped wafer.

Claims 2 and 15 depend, respectively, from claims 1 and 14. Claims 2 and 15 are not obvious over cited references for the reasons stated with respect to claims 1 and 14. Notably the references provide no teaching or motivation for applying a dicing tape including an adhesive layer that contacts and conforms to one or more bump electrodes of a wafer. The addition of Kojima does not cure the defects of Glenn and Saito.

Applicants respectfully request that the Patent Office withdraw the rejection to claims 2 and 15 under 35 U.S.C. §103(a).

C. 35 U.S.C. §103(a): Rejection of Claims 3, 18 and 20

The Patent Office rejects claims 3, 18 and 20 under 35 U.S.C. §103(a) as obvious over Glenn and Saito and Kojima and further in view of U.S. Patent Application 2002/0001688 of Ueda, et al. (Ueda). Ueda is cited for teaching the use of a pressure roller to form an adhesive sheet.

Claims 3, 18 and 20 depend, respectively, from claims 1 and 14, and therefore contain all the limitations of those claims. For the reasons stated with respect to claims 1 and 14, claim 3, 18 and 20 are not obvious over the cited references. The addition of the teachings of Ueda regarding the use of a pressure roller does not cure the defect of the other references' failure to describe applying a tape to a wafer with an adhesive layer that contacts and conforms to one or more bump electrodes of the wafer.

Applicants respectfully request that the Patent Office withdraw the rejection to claims 3, 18 and 20 under 35 U.S.C. §103(a).

D. 35 U.S.C. §103(a): Rejection of Claims 21

The Patent Office rejects claim 21 under 35 U.S.C. §103(a) as obvious over Glenn, Saito, Kojima, Ueda and further view of U.S. Patent Application 2003/0180987 of Milla (Milla). Milla is cited for describing a dual blade to dice a wafer in a wafer saw.

Claim 21 depends on claim 14 and therefore contains all the limitations of that claim. For these reasons stated above with respect to claim 14, claim 21 is not obvious over the cited references. Milla does not cure the deficiencies of the other references with respect to the limitations of claim 14.

Applicant respectfully requests that the Patent Office withdraw the rejection to claim 21 under 35 U.S.C. §103(a).

E. Objection to Claims 4-6, 8, 19 and 22

The Patent Office objects to claims 4-6, 8, 19 and 22 as dependent upon a rejected base claim, but notes such claims would be allowable if rewritten in independent form. As noted above, Applicant believes independent claims 1 and 14 are allowable over the cited art. Therefore, Applicant respectfully requests the Patent Office withdraw the objection to claims 4-6, 8, 19 and 22.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

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I hereby certify that this correspondence is being transmitted by facsimile on the date shown below to the United States Patent and Trademark Office.

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